



# Preliminary Advanced Colloids Experiment – 1&2 (PACE-1 & PACE-2)

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## Objective:

- ◆ PACE-1: Risk mitigation for future Advanced Colloids Experiments (ACE). Determine and document which magnifications are usable (50x, 63x, 100x) with both air and oil, immersion microscope objectives in an ISS vibration environment.
- ◆ PACE-2: View dilute solution of dyed particles. Different size particles combined in an actual (fluid filled and pre-sealed) sample cell. Dye each particle size a different color, which can be selected for viewing with the filter cube in the microscope, one size at a time.
- ◆ Develop crew procedures for changing PACE and ACE samples.

## Relevance/Impact:

- ◆ Use this opportunity to characterize the capability of conducting high magnification imaging with LMM using a test target and test particles. This will be done to find what are the minimum size particles are needed for ACE, given microscope vibration and magnification results.

## Development Approach:

- ◆ Compare Space Acceleration Measurement System (SAMS) data with image quality to correlate operation windows.
- ◆ Run through various operational scenarios (regular crew activity (nominal / exercise / sleep), equipment operations (pumps, actuators, thruster firing, etc.)
- ◆ Compare results obtained with different microscope objective index matching fluids (air and oil).

PACE-1 test target



## ISS Resource Requirements

<b>Accommodation (carrier)</b>	Fluids Integrated Rack (FIR)
<b>Upmass (kg)</b> (w/o packing factor)	5 kg for PACE test module inside Equipment Transfer Module (ETM)
<b>Volume (m<sup>3</sup>)</b> (w/o packing factor)	0.01 m <sup>3</sup> for PACE
<b>Power (kw)</b> (peak)	0.5 kw for PACE / LMM 1.1 kw for FIR & PACE / LMM
<b>Crew Time (hrs)</b> (installation/operations)	14 Hours / Autonomous
<b>Autonomous Operation</b>	4 months of intermittent operations
<b>Launch/Increment</b>	2010 PACE/ 19A, PACE-2/ULF-5 MPLM

## Project Life Cycle Schedule

Milestones	SCR	RDR	PDR/CDR	VRR	Safety	FHA	Launch	Ops	Return	Final Report
<b>PACE-1</b>	Aug 2009	N/A	N/A	N/A	10/2010	11/09	3/2010	Inc. 23-25	N/A	2011
<b>PACE-2</b>	Aug 2010	N/A	N/A	N/A	1/2010	4/10	9/2010	Inc. 24-26	N/A	2011